The ClimateTrust®

Environmental Markets and Biogas: Valuing Climate Benefits

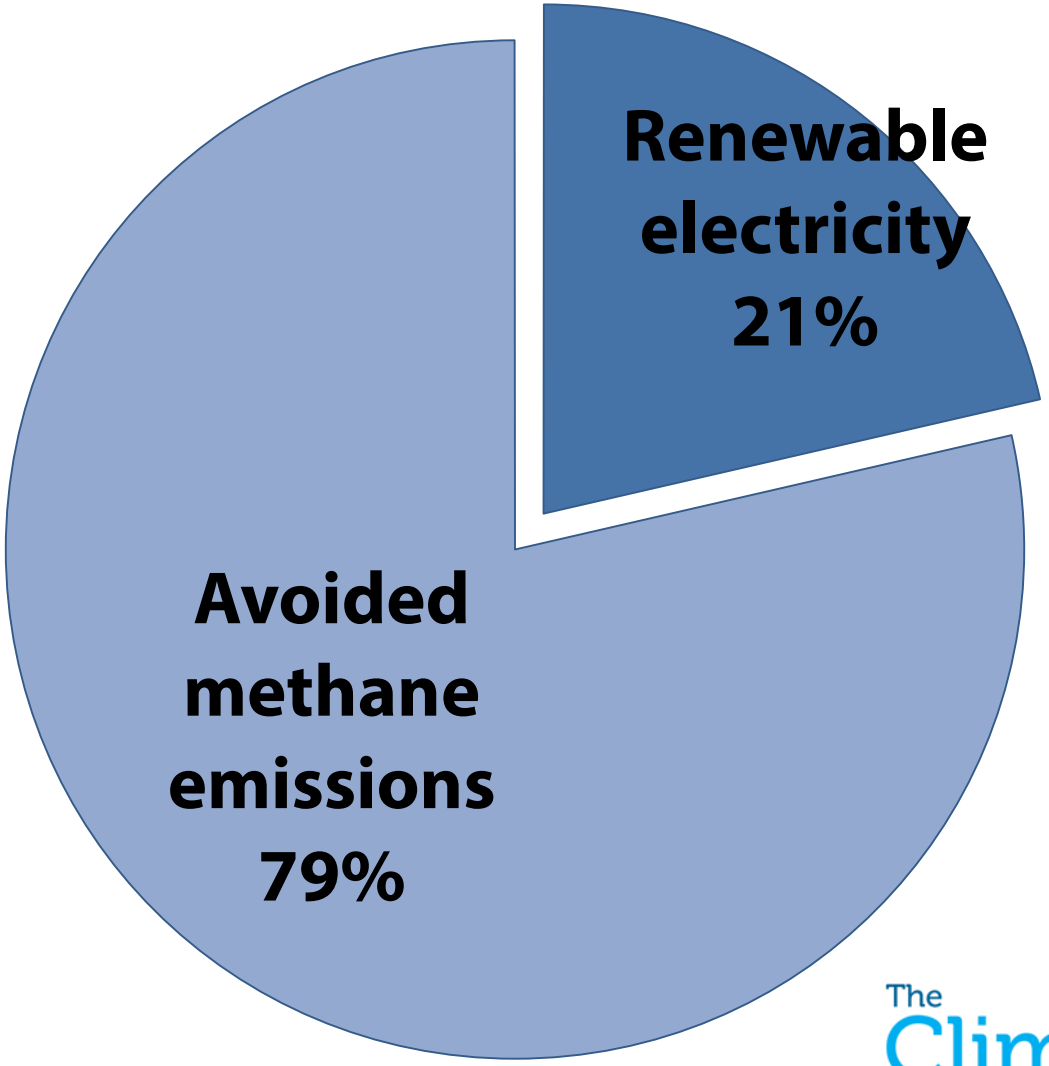
Peter Weisberg

June 12, 2013

Indianapolis, IN

EPA 2013 AgStar National Conference

Climate Benefits of a 2,000 cow, 750 kw Diary Digester



The ClimateTrust®

Environmental Markets and Biogas

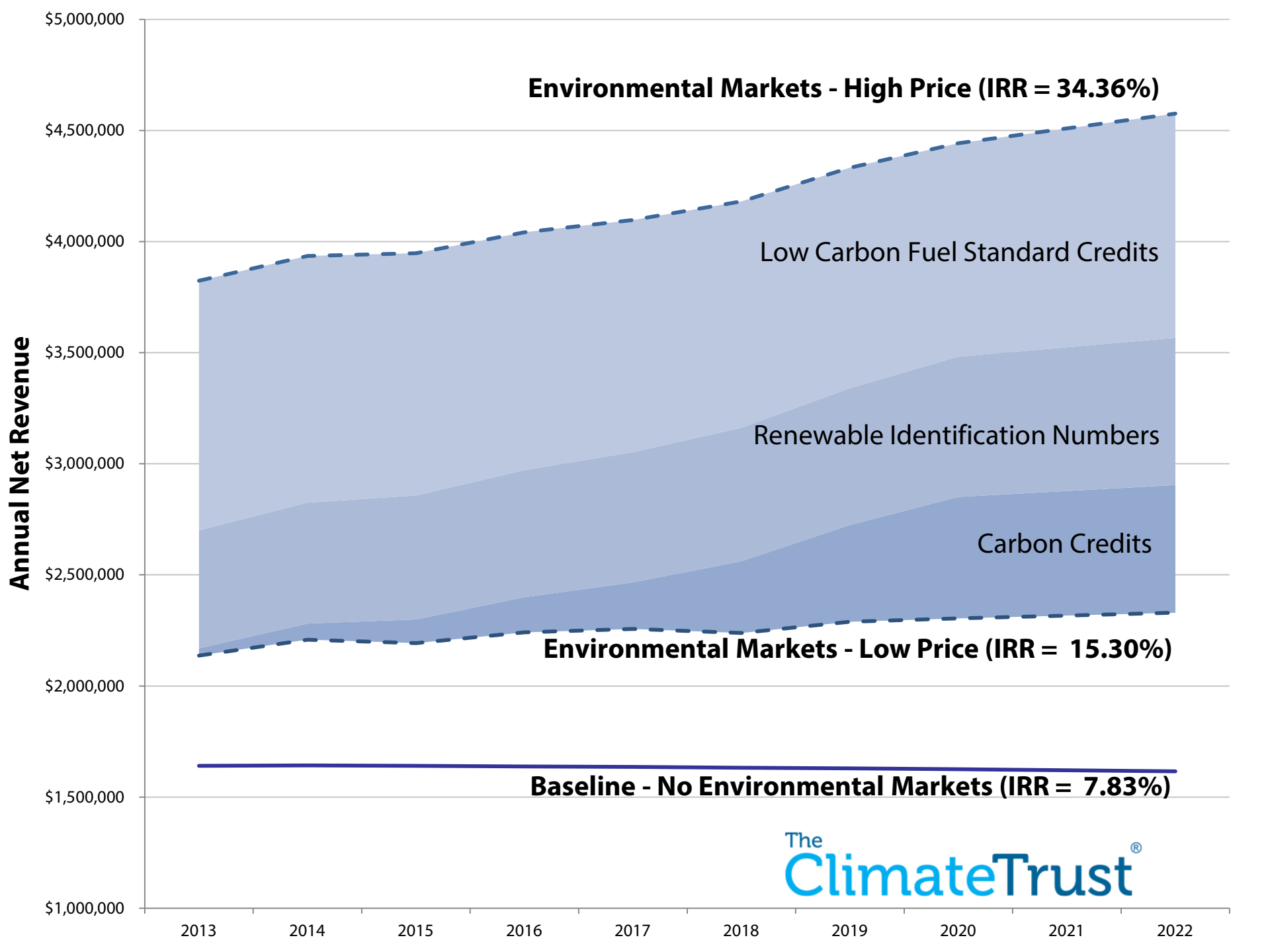
1. Carbon Markets
2. Low Carbon Fuel Standard Credits
3. Renewable Identification Numbers (RINs)

The ClimateTrust®

Environmental Markets for Biogas

Market	Credit	Biogas Use	Geographic Limitation
California Cap-and-Trade	Offset	Any	Anywhere in the US
California Low Carbon Fuel Standard	LCFS Credit	Transportation fuel	Fuel consumed in California
US Renewable Fuel Standard	RIN (Renewable Identification Number)	Transportation fuel	Anywhere in the US

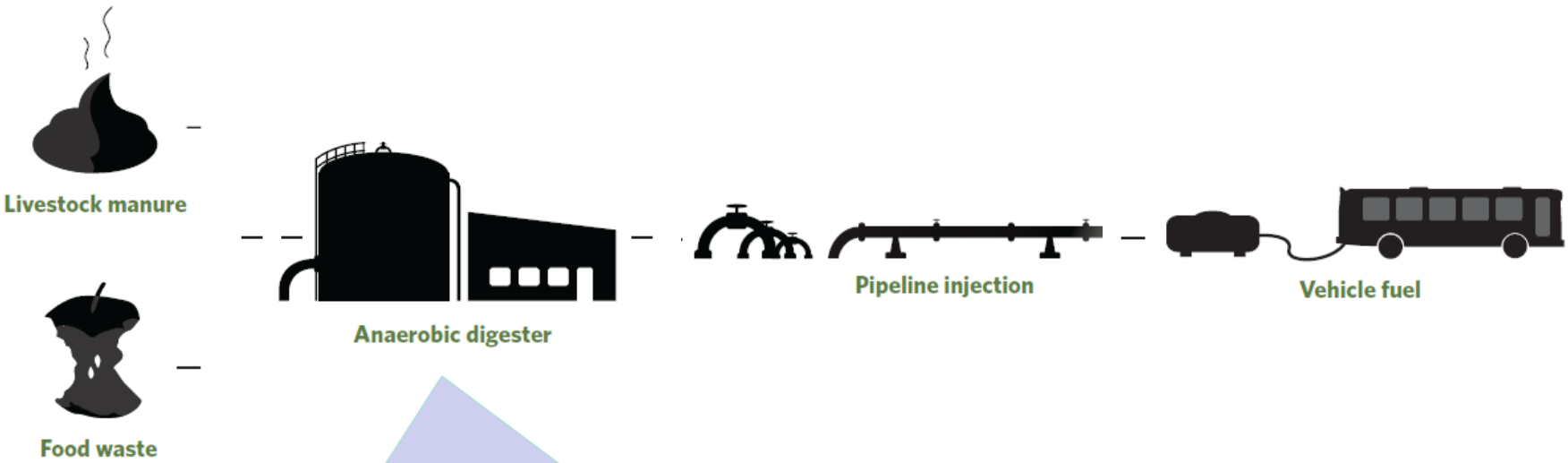
The ClimateTrust®


$5,000,000
$4,500,000
$4,000,000
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
Annual Net Revenue
Environmental Markets - High Price (IRR = 34.36%)
Low Carbon Fuel Standard Credits
Renewable Identification Numbers
Carbon Credits
Environmental Markets - Low Price (IRR = 15.30%)
Baseline - No Environmental Markets (IRR = 7.83%)
The ClimateTrust®
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

California Carbon Market Key Insights

- Buyers = Large emitters in California
- Offset Project Types:
  - Livestock manure
  - (Post-consumer food waste = voluntary, not yet accepted by California)
- Sunset: 2020

The ClimateTrust®



Offsets generated and owned by the digester

The ClimateTrust®

Offset Value

=

Offset Quantity x Carbon Price

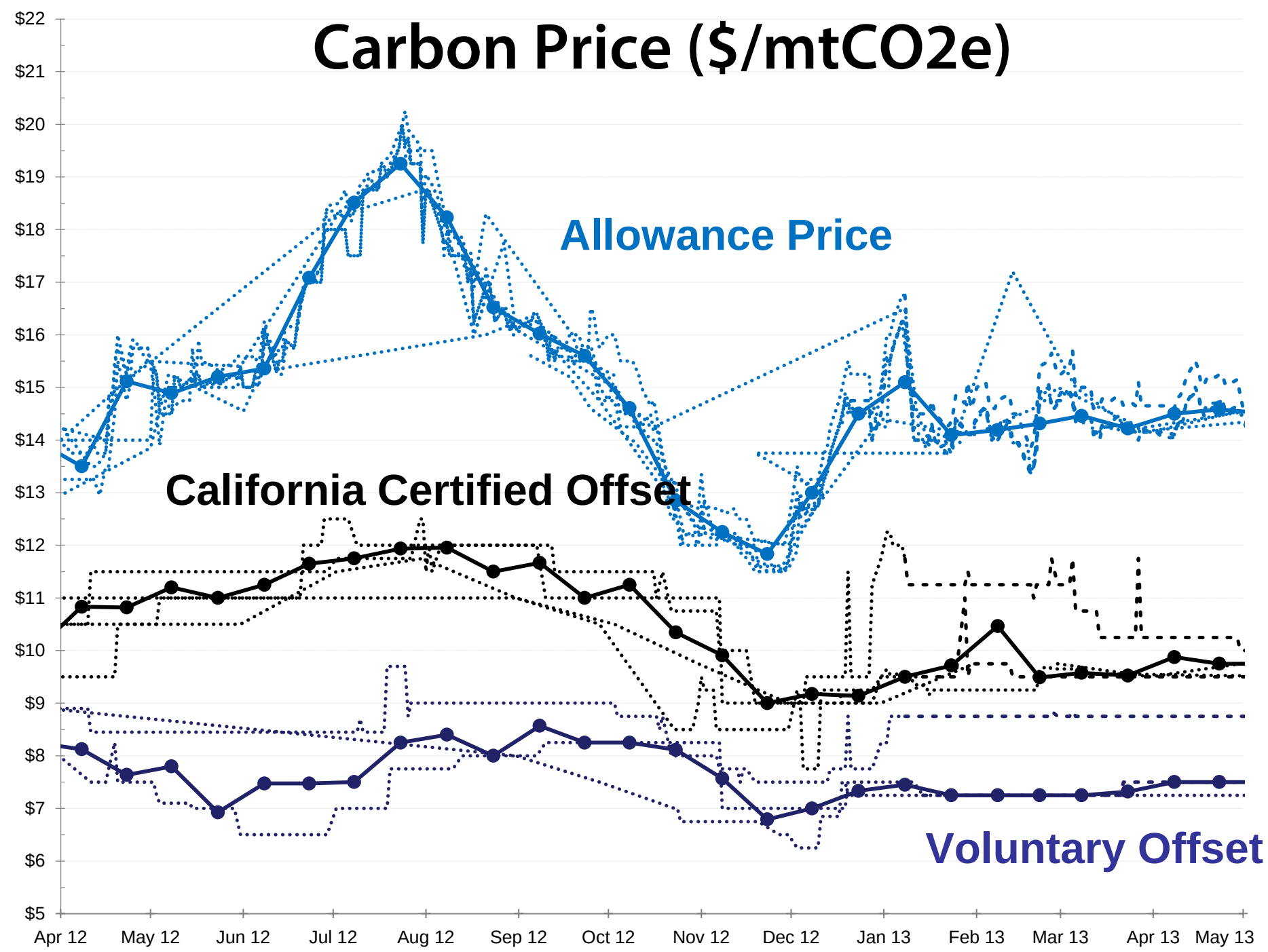
– Transaction Costs

The ClimateTrust®

Offset Quantity

- Estimation:
  - 2.5 – 4 offsets/cow
- Quantification – Model methane emissions
  - Temperature
  - Historic manure management
  - Project design

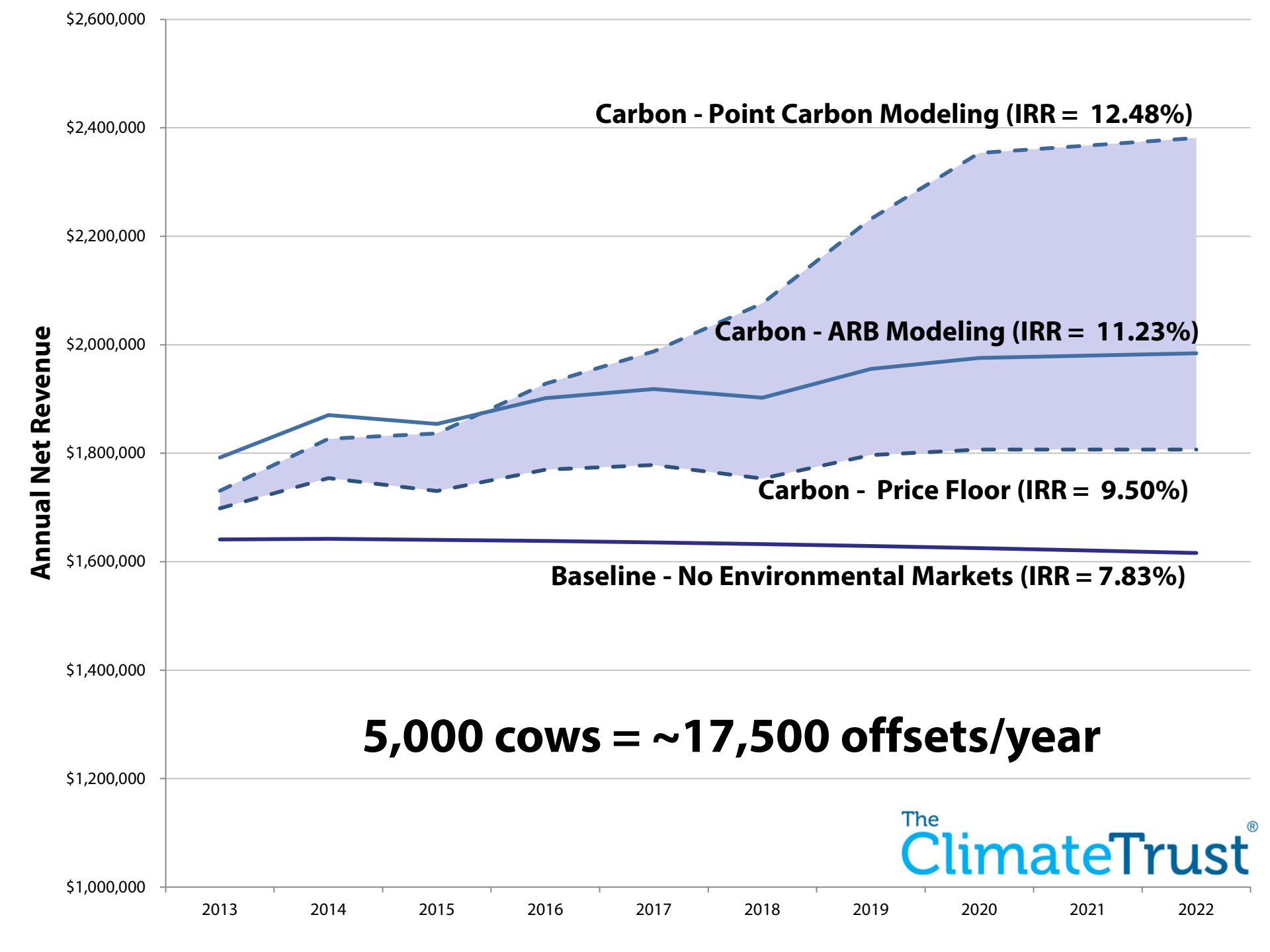
The ClimateTrust®


Carbon Price ($/mtCO2e)
$22
$21
$20
$19
$18
$17
$16
$15
$14
$13
$12
$11
$10
$9
$8
$7
$6
$5
Allowance Price
California Certified Offset
Voluntary Offset
Apr 12
May 12
Jun 12
Jul 12
Aug 12
Sep 12
Oct 12
Nov 12
Dec 12
Jan 13
Feb 13
Mar 13
Apr 13
May 13

Transaction Costs

- Monitoring and Reporting
- Verification - $10,000/year
- Account fee - $500/year
- Registration fee - ~$0.23/credit
- Commercialization

The ClimateTrust®


Annual Net Revenue
$2,600,000
$2,400,000
$2,200,000
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Carbon - Point Carbon Modeling (IRR = 12.48%)
Carbon - ARB Modeling (IRR = 11.23%)
Carbon - Price Floor (IRR = 9.50%)
Baseline - No Environmental Markets (IRR = 7.83%)
5,000 cows = ~17,500 offsets/year
The ClimateTrust®

California Carbon Market Uncertainty

- Long-term contracts require “regulatory out”

	2013	2016
Feb. `13 Auction	$13.62 100% sold	$10.71 **46%** sold
May `13 Auction	$14.00 100% sold	$10.71 **79%** sold

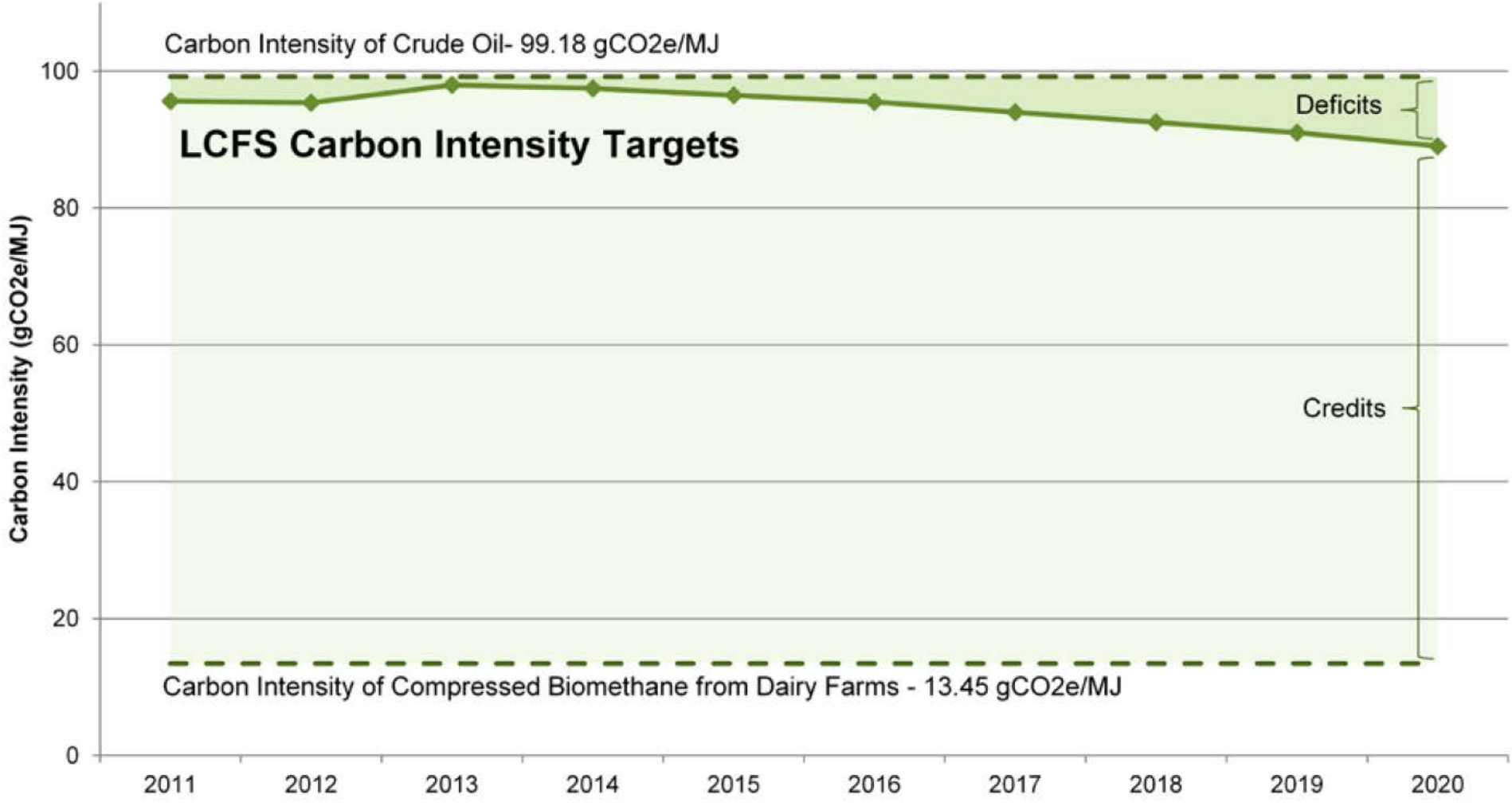
The ClimateTrust®

Low Carbon Fuel Standard Key Insights

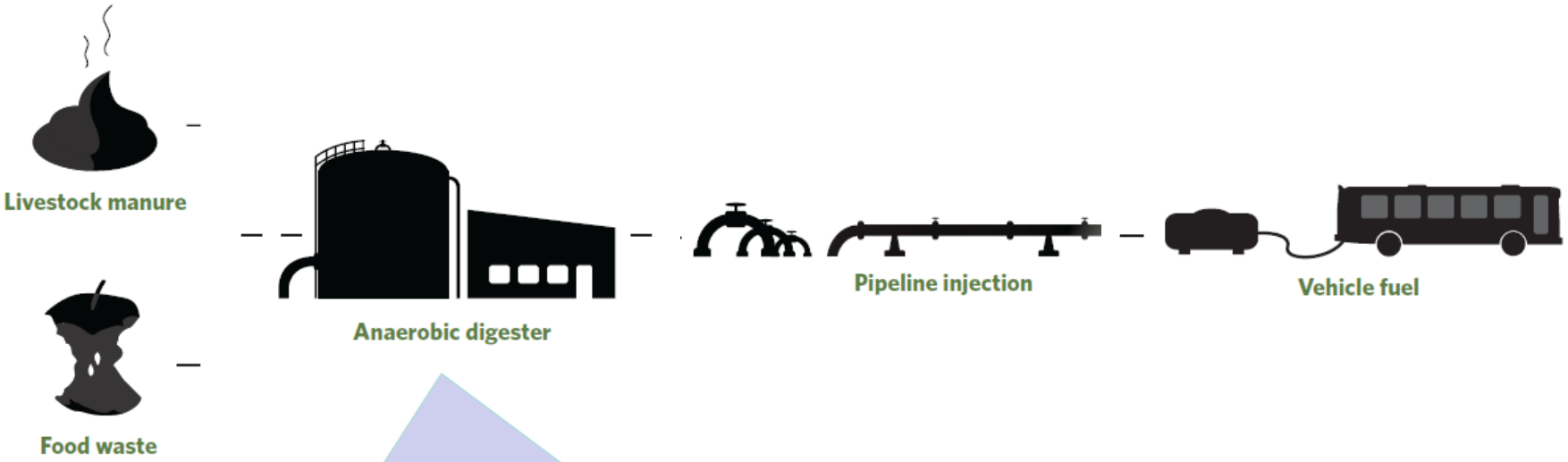
- Biogas must be consumed as transportation fuel in California
  - Out of state: “Physical Pathway”
- Buyer = Transportation fuel refiners and importers in California
- Sunset: 2020
  - (2020 target applies until legislation is modified)

The ClimateTrust®

Low Carbon Fuel Standard Credits



The ClimateTrust®



LCFS credits generated and owned by the digester.

*Must report data from fueling station

The ClimateTrust®

LCFS Value

=

LCFS Credits x LCFS Price

– Transaction Costs

The ClimateTrust®

LCFS Credit Quantification for dairy digesters

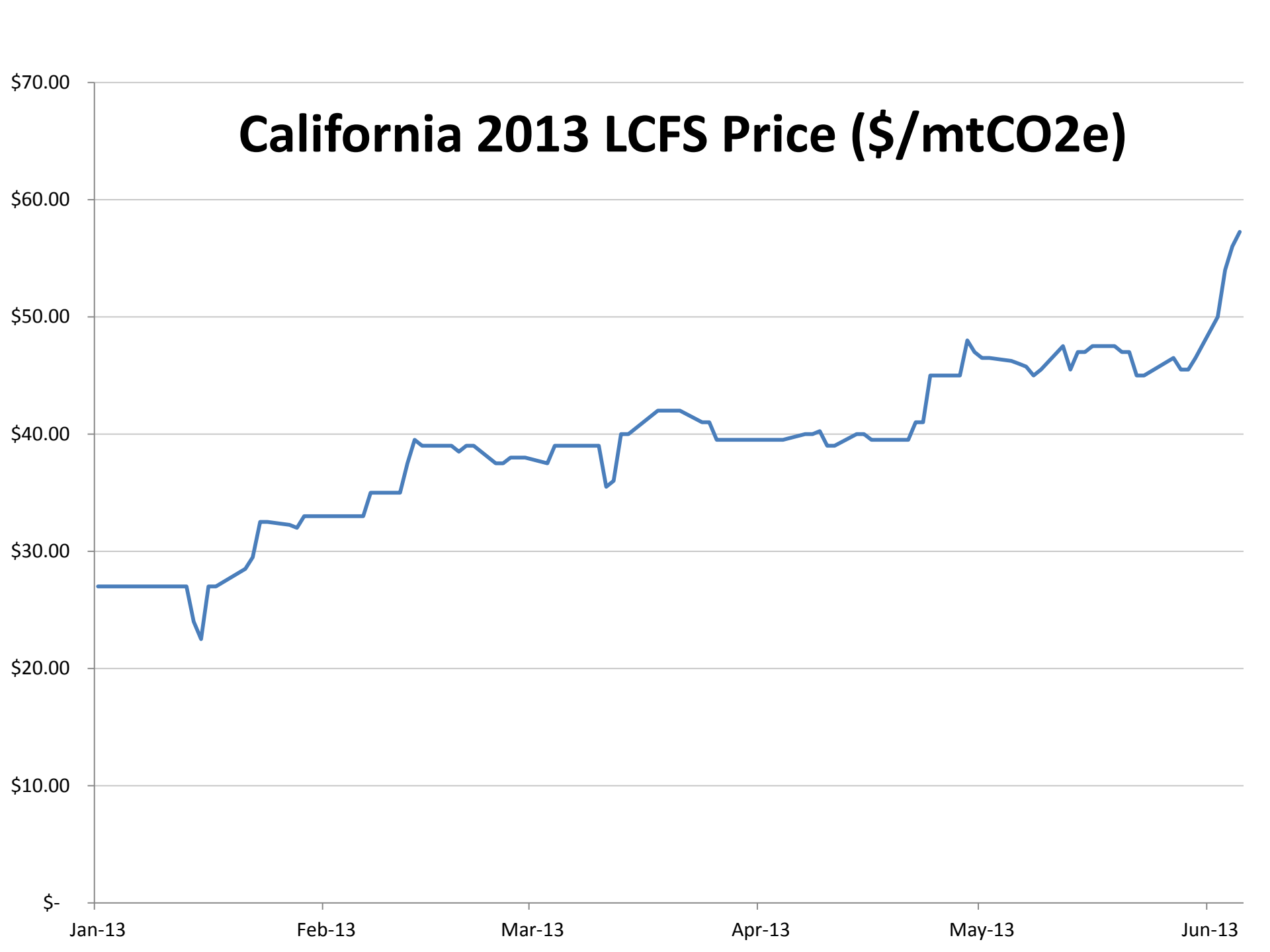
- 2013:

  ~0.0892 LCFS credits/MMBTU

- 2020

  ~0.0798 LCFS credits/MMBTU

The ClimateTrust®

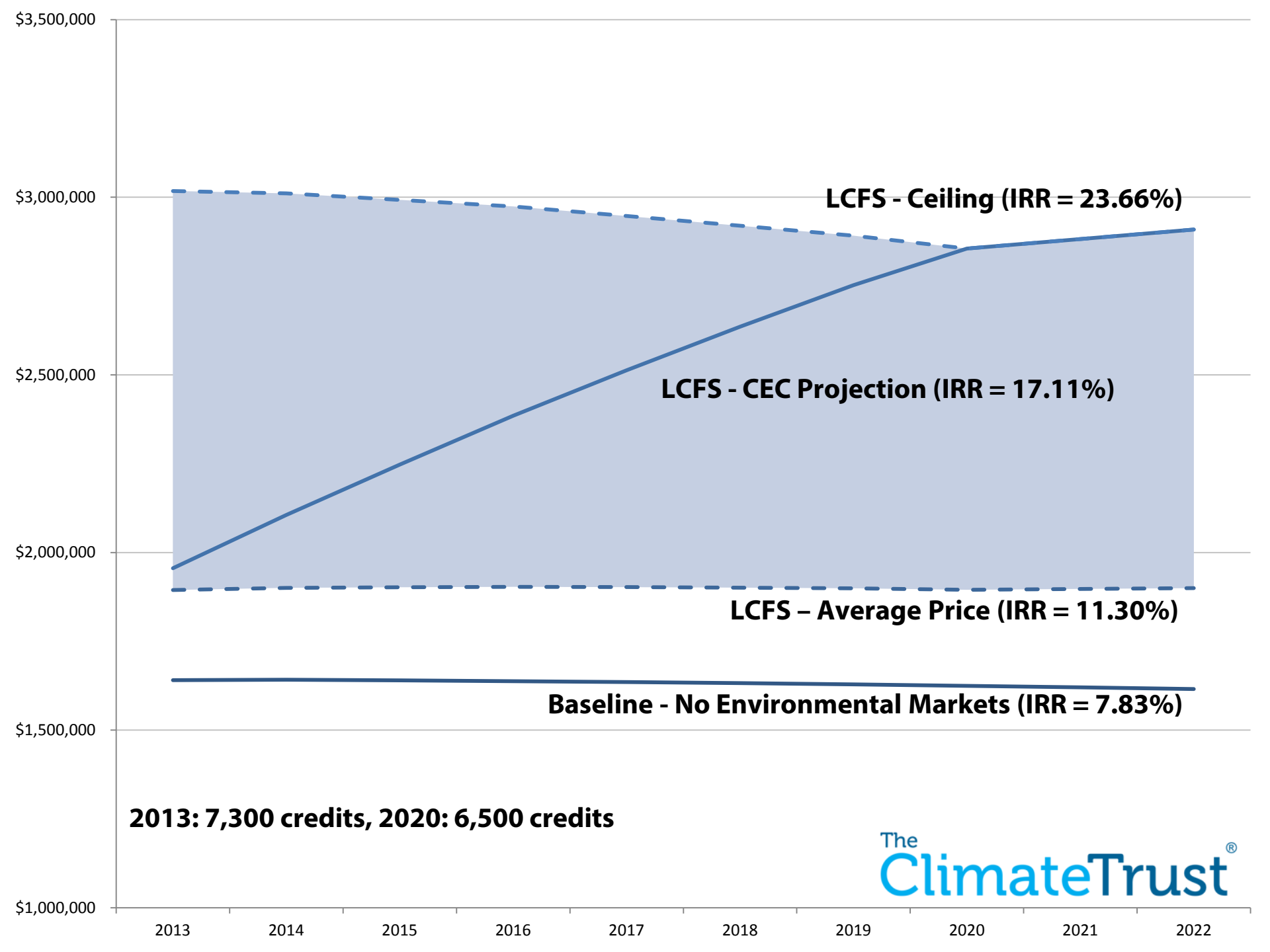

California 2013 LCFS Price ($/mtCO2e)
$70.00
$60.00
$50.00
$40.00
$30.00
$20.00
$10.00
$-
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13

California LCFS Credit Prices
January 2013 – June 2013

	$/mtCO2e	$/MMBTU[1]	$/DGE[1] (diesel gallon equivalent)
Low	$22.50	$2.01	$0.26
Average	$39.03	$3.49	$0.45
High	$57.25	$5.12	$0.66
Current	$57.25	$5.12	$0.66

[1] $/MMBTU and $/DGE prices for 2013; credits generated per MMBTU or DGE vary annually as the CA LCFS carbon intensity target is adjusted down.

The ClimateTrust®


$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
LCFS - Ceiling (IRR = 23.66%)
LCFS - CEC Projection (IRR = 17.11%)
LCFS – Average Price (IRR = 11.30%)
Baseline - No Environmental Markets (IRR = 7.83%)
2013: 7,300 credits, 2020: 6,500 credits
The ClimateTrust®
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

Low Carbon Fuel Standard Uncertainty

- Commerce clause violation
  - US District Court – Unconstitutional
  - Ninth Circuit – Stay of preliminary injunction

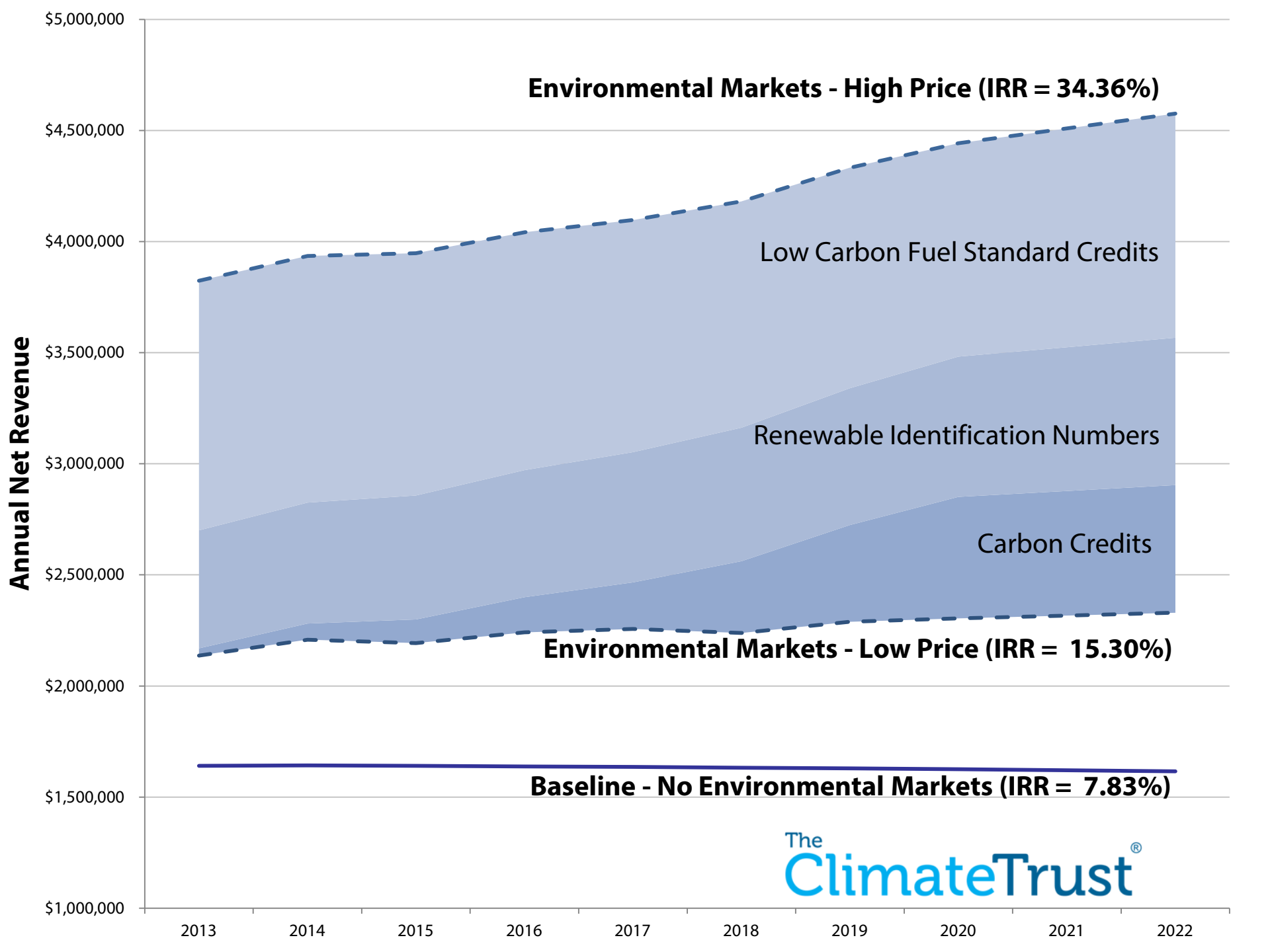
The ClimateTrust®

LCFS vs RIN Revenue

	$/MMBTU	$/DGE (diesel gallon equivalent)
LCFS Current Price[1]	$5.12	$0.66
RIN Current Price	$13.77	$1.78

[1] $/MMBTU and $/DGE prices for 2013; credits generated per MMBTU or DGE vary annual as the CA LCFS carbon intensity target is adjusted down.

The ClimateTrust®


$5,000,000
$4,500,000
$4,000,000
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
Annual Net Revenue
Environmental Markets - High Price (IRR = 34.36%)
Low Carbon Fuel Standard Credits
Renewable Identification Numbers
Carbon Credits
Environmental Markets - Low Price (IRR = 15.30%)
Baseline - No Environmental Markets (IRR = 7.83%)
The ClimateTrust®
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

Thank you!

Peter Weisberg
Program Manager
The Climate Trust

pweisberg@climatetrust.org
(503)238-1915 x207

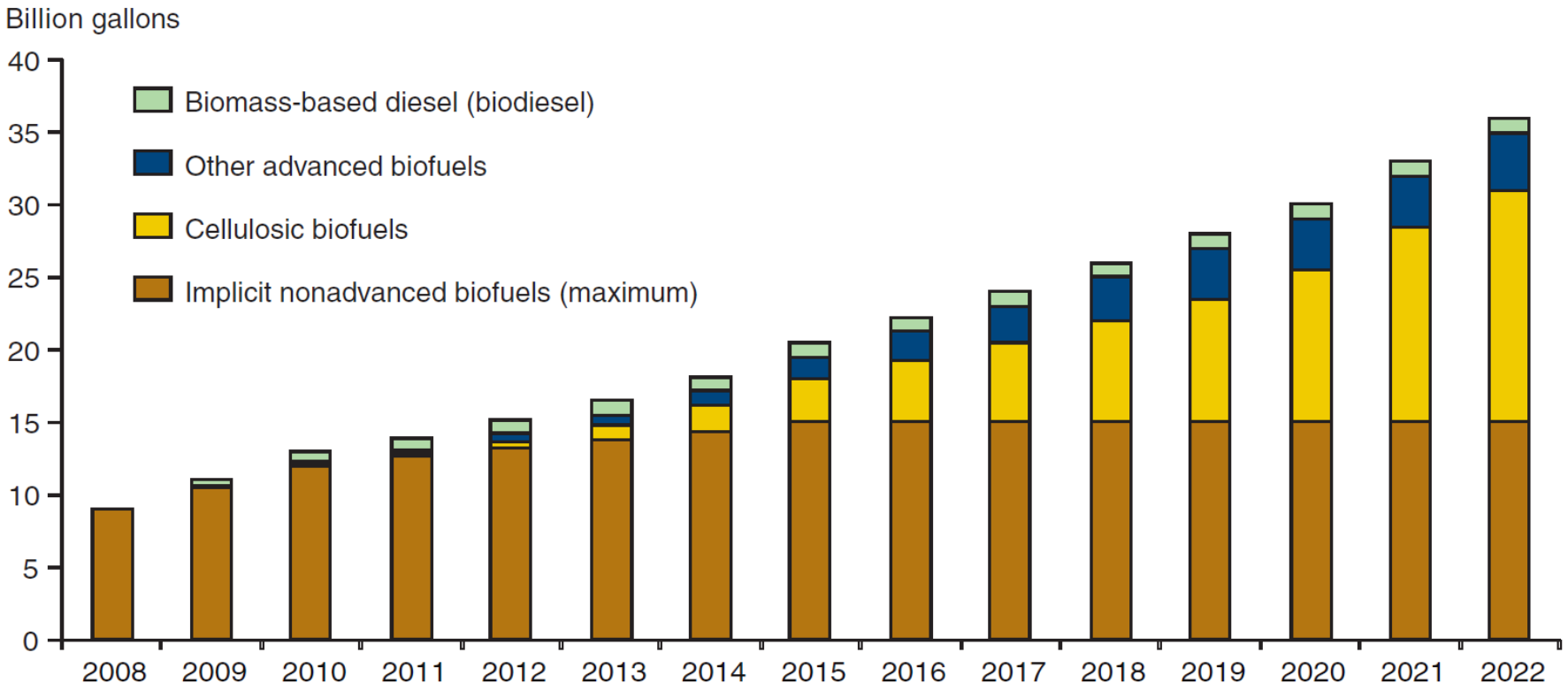
The ClimateTrust®

Renewable Identification Numbers Key Insights

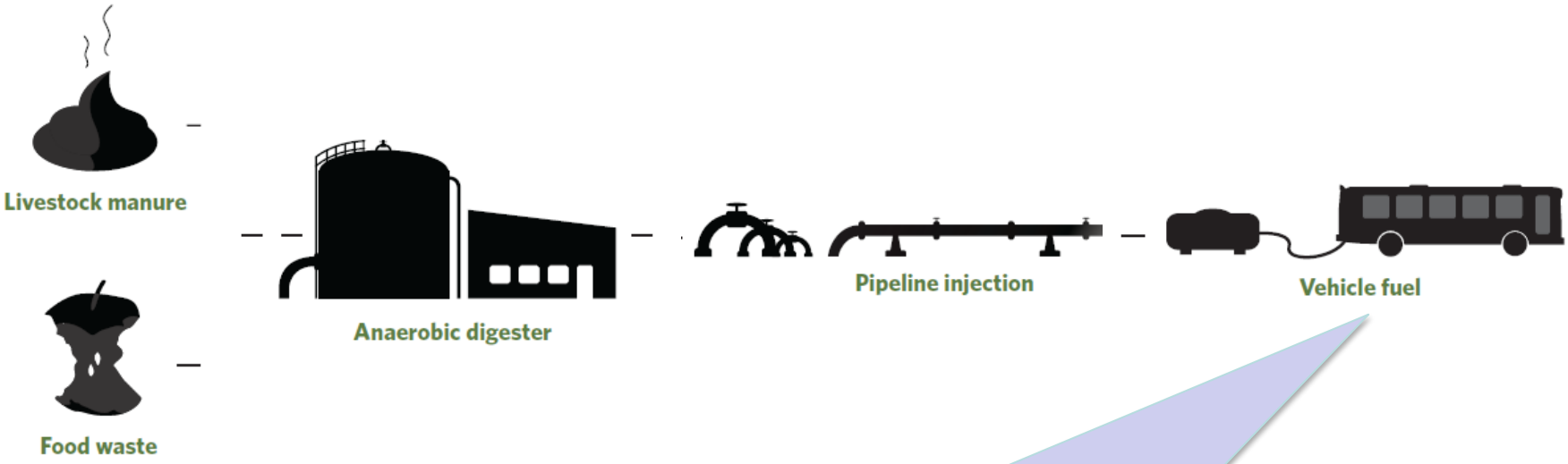
- Buyer: Transportation fuel refiners and importers
- Project types: Biogas from
  - Dairies
  - Waste water treatment plants
  - Landfills
  - ("Waste digesters" under proposed new rules)
- Sunset: 2022

The ClimateTrust®

RINs and the Renewable Fuel Standard 2

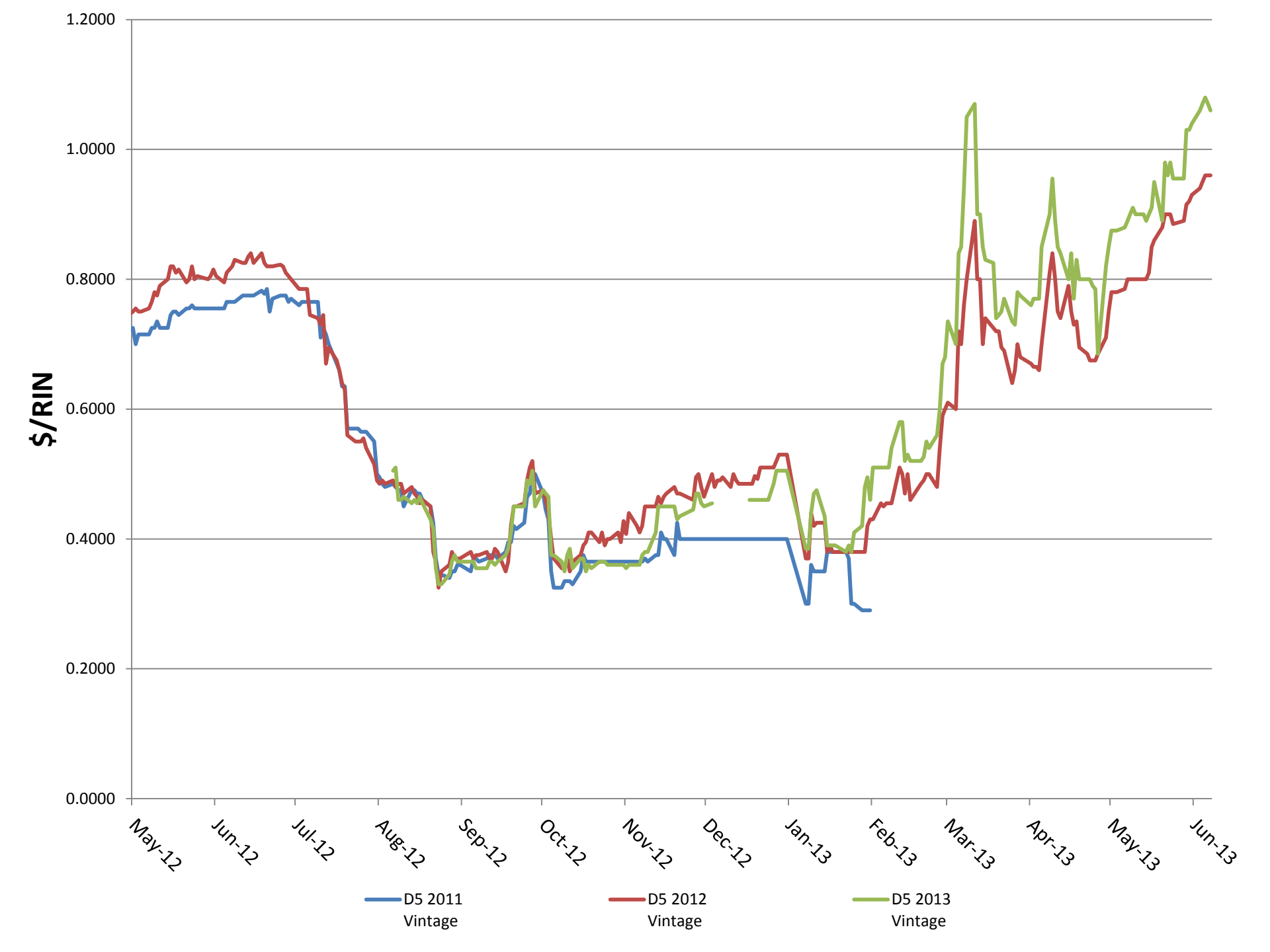


The ClimateTrust®



RINs generated and owned by the fueling station

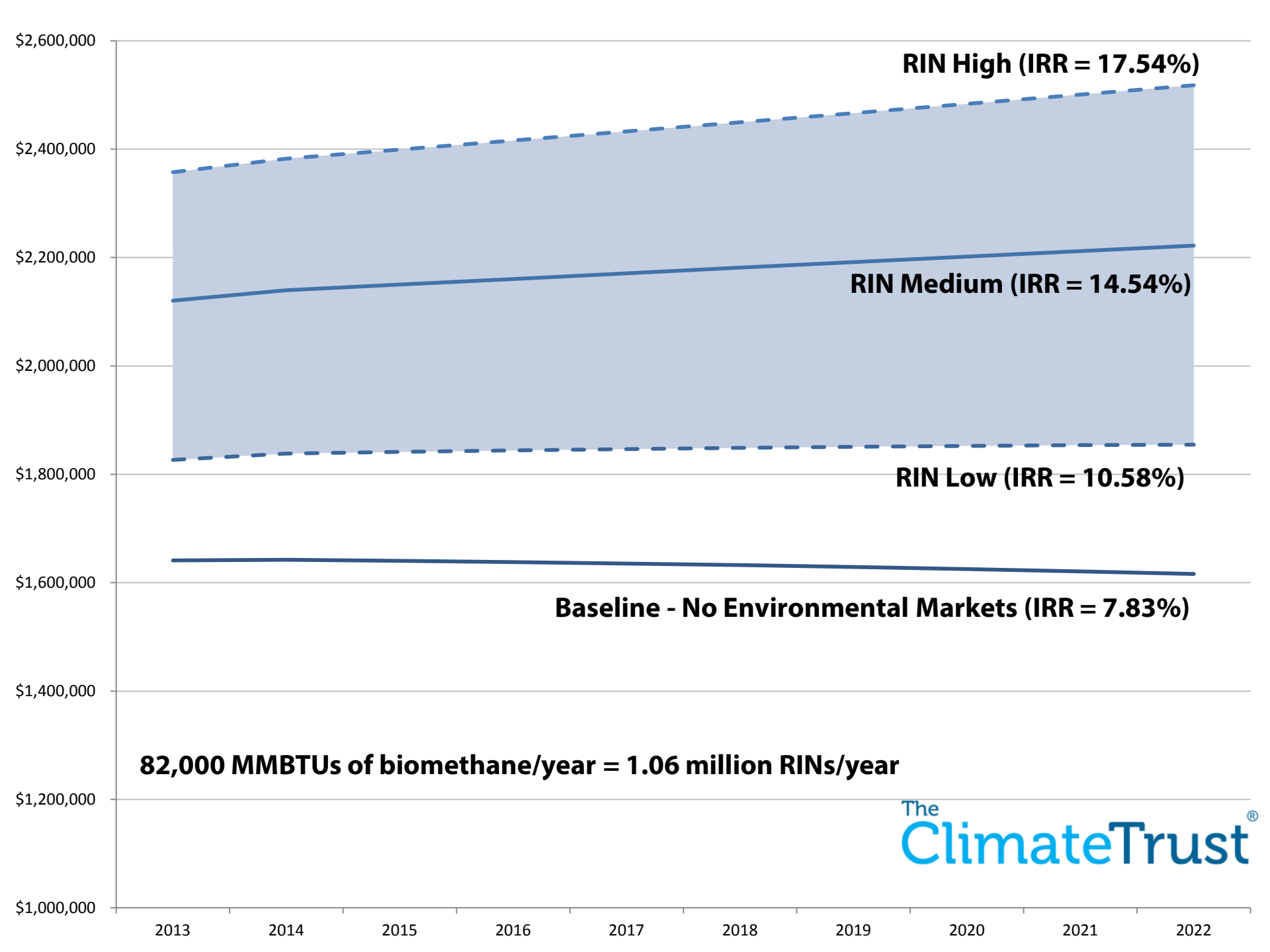
The ClimateTrust®


1.2000
1.0000
0.8000
0.6000
0.4000
0.2000
0.0000
$/RIN
May-12
Jun-12
Jul-12
Aug-12
Sep-12
Oct-12
Nov-12
Dec-12
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
D5 2011 Vintage
D5 2012 Vintage
D5 2013 Vintage

Advanced Biodiesel RIN Prices
May 2012 – June 2013

	$/RIN	$/MMBTU	$/DGE (diesel gallon equivalent)
Low	$0.29	$3.77	$0.49
Average	$0.564	$7.33	$0.95
High	$1.08	$14.03	$1.82
Current	$1.06	$13.77	$1.78

Henry Hub Natural Gas Price:


$2,600,000
$2,400,000
$2,200,000
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
RIN High (IRR = 17.54%)
RIN Medium (IRR = 14.54%)
RIN Low (IRR = 10.58%)
Baseline - No Environmental Markets (IRR = 7.83%)
82,000 MMBTUs of biomethane/year = 1.06 million RINs/year
The ClimateTrust®

RIN Market Uncertainty

- Volatility
  - Brazilian sugar cane ethanol = Advanced Biodiesel RIN
- Annual adjustment of required RIN retirement

The ClimateTrust®